NOTES ON METEOROLOGY AND CLIMATOLOGY

CLIMATIC PROVINCES OF THE PACIFIC COAST

THE primary control of the Pacific coast climates rests with the ocean and the almost continuous westerly winds. Since the ocean has practically the same temperature all along the coast, the north and south temperature gradients on land are gentle. On the other hand, the mountain ranges paralleling the coast bring about sharp transitions in an east-west line—so that in summer one may pass in a few hours from the cold coast to a hot interior valley. The ocean, the west wind, and the mountains, thus, make the climatic provinces into belts roughly parallel to the coast. These belts may be subdivided on the basis of rainfall, which decreases rapidly from north to south. Mr. W. G. Reed has ably discussed and mapped such a distribution of climatic provinces in the January, 1915, *Bulletin of the American Geographical Society* (pp. 1–19, 4 figures). The classification in abstract is as follows:

I. Pacific Province, marked subtropical winter rains, dry or nearly dry summers.
  1. California District, dry summers, infrequent winter snows.
    a. Southern California Region, dry summers 3–4 months long, annual rainfall less than 20 inches.
    b. Central California Region, dry summers 2 months long, annual rainfall 10–30 inches.
    c. Northern California Region, annual rainfall more than 30 inches.
    d. Sierra Region, annual rainfall greater than the central region, much snow.
    e. Tulare Region, annual rainfall less than 10 inches, largest temperature ranges in this district.
  2. Oregonian District, light cyclonic summer rains.
    a. Coast Region, heavy annual rainfall.
    b. Valley Region, least annual rainfall of district.
    c. Cascade Region, intermediate rainfall, more snow than elsewhere in district.

II. Rain Shadow Area, large diurnal and annual ranges of temperature and generally deficient precipitations.
  3. Great Basin District, high maximum temperatures, annual rainfall generally less than 10 inches.
  4. Snake River District, annual rainfall 10–20 inches, sub-Pacific type of distribution.

EFFECT OF CLIMATE ON LOCATION OF MANUFACTURING PLANTS

A PAPER on this subject read by Mr. W. M. Booth at a meeting of the American Institute of Chemical Engineers appears in abstract in the *Scientific American Supplement* for April 3, 1915 (p. 219). The principal manufacturing belt of the United States is located north of the regions where summer heat interferes much with indoor work, and south of the areas blocked by heavy winter snows and hampered by frozen waterways. Within this belt specific climatic conditions may determine the distribution of certain industries. For instance, the manufacture of enameled leather is dependent on sunshine. Atmospheric dryness is an advantage where hygroscopic articles, small steel parts, and other things injured by moisture are manufactured or packed. On the other hand, moist air and equable temperature are desirable for the successful manufacture of linen, cotton, jute and hemp. This accounts for the importance of Fall River, Providence, Lawrence and Lowell as cotton mill centers. Similarly, some of the Pacific Coast cities may become textile centers when labor and markets permit. Adverse climatic conditions may be artificially overcome where other factors make the business sufficiently profitable.

CLIFF DWELLINGS AND CHANGES IN CLIMATE

FROM the abundance of abandoned cliff-dwellings in the Navajo Country of the arid southwest, it might be assumed that there was once a rainfall capable of supporting a popula-

tion much larger than the present. Professor H. E. Gregory at the joint geographical meeting in New York (April 9–10, 1915) has pointed out that the Hopis who built the cliff-dwellings are migratory and frequently abandon a village after having lived in it some years. Therefore, the numerous abandoned villages do not necessarily indicate a larger population and a climate more moist in the later prehistoric times.

THUNDER AND LIGHTNING

Dr. Wm. Schmidt, after many observations with his thunder-recorder, finds[1] that we hear but little of the air vibrations produced by lightning. Thunder is accompanied by irregular pressure changes lasting 1/40 of a second or more and some only 1/75 to 1/120 of a second. The periods of most of the longer pressure waves are 1/10 to 1/3 second—too long for ear perception. Much of the mechanical injury done where lightning strikes is probably due to these waves. From a distance one violent wave comes first, then follow perhaps two or three series of three to four heavy waves each. On account of atmospheric action on irregular waves the thunder becomes of more or less definite pitch. Dr. Schmidt has inferred that at the source the lightning energy may be five million times as great as that of the thunder it produces.

Insurance statistics from both Canada and the United States show the efficacy of lightning rods in keeping buildings from taking fire if they are struck.[2] In Ontario, taking equal numbers of rodded and unrodded farm buildings, twenty times as many of the latter as of the former were struck. In the United States in 1912 and 1913 two hundred insurance companies reported 1,845 buildings struck, of which but 67 were rodded. Considering that 31 per cent. of all buildings insured were rodded, the lightning rod efficiency is thus 93 per cent. Furthermore, the reports of five companies for a period of 13 to 25 years on 18,000 buildings insured, over 50 per cent. being rodded, showed that the average damage of the struck buildings was $10 for the rodded and $2,200 for the unrodded.[3]

According to the best European data, the maximum period for thunderstorms is from 3 to 5 P.M., while the minimum falls just after midnight and from 7 to 8 A.M. The month of greatest frequency is June and those of least are December and January.[4]

Of the 4,520 fires reported on the national forests in 1913, 1,571, or about 35 per cent., were ascribed to lightning.

NOTES

An unseasonal northeast snowstorm accompanying an intense tropical cyclone visited the Atlantic coast on April 2, 1915. Snow fell from Georgia northward, the heaviest about ten inches being recorded around Raleigh, N. C., at the head of Chesapeake Bay, and on the New England coast. The inland extent was generally less than 200 miles; in the north the railroads reported Utica, N. Y., Woodsville, Vt., and Kineo, Me., as the limits. Raleigh, N. C., seems to have suffered most, being without outside telegraphic communication for five days. In other districts traffic was hampered. The snow melted very rapidly and with little or no runoff, owing to the extremely dry conditions of the soil after an almost rainless March. Thus agriculturally this snowstorm was of great value.

On May 1 the British Meteorological Office ceased issuing forecasts except to farmers. This was thought necessary because the forecasts might be of value to the Germans.

The announcement for the 1915 international kite and balloon flights came from the Nicholas Central Observatory at Petrograd instead of from Strassburg as heretofore.

[1] *Monthly Weather Rev.*, December, 1914, pp. 665–671; *Scientific American Supplement*, March 13, 1915, p. 175.

[2] See *Scientific American*, November 28, 1914, p. 347, and April 3, 1915, p. 303.

[3] See also J. Warren Smith, "Efficiency of Lightning Rods," *Ohio Naturalist*, Columbus, O., February, 1915, pp. 437–442.

[4] J. von Hann, "Neue Beitrage zur Kenntnis der taglichen Periode der Gewitter," *Meteorologische Zeitschrift*, February, 1915, pp. 73–82.

Since the closing of the Mount Weather research observatory last winter, the Blue Hill Meteorological Observatory is alone in the United States in regularly flying kites in the international days. However, the Weather Bureau is planning to resume aerological work at Omaha.

A MAP of the eastern United States showing the frequency of dry spells during the last twenty years in the months of April to September inclusive was published in the National Weather and Crop Bulletin, May 4, 1915. The greatest frequency is found in the Great Plains district and the least in the southern Appalachians.

DR. W. KÖPPEN, after study of the monthly period in the weather[5] has come to the conclusion that the moon has no noticeable influence on meteorological phenomena.

A KNIGHTHOOD has been conferred on Dr. W. N. Shaw, director of the British Meteorological Service.

MR. AKSEL S. STEEN, who recently succeeded Dr. Mohn as Director of the Norwegian Meteorological Institution, died in Christiania on May 10.

A NEW departure in the distribution of weather forecasts is announced from Illinois where a newspaper man and the Springfield Watch Co. send out the predictions by wireless telegraph.

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SPECIAL ARTICLES

ON THE REPRODUCTIVE AND HOST HABITS OF CUTEREBRA AND DERMATOBIA

IN view of the considerable mystery surrounding the host habits of *Dermatobia hominis,* the man-infesting bot of tropical America, now believed to employ bloodsucking mosquitoes of the genus *Janthinosoma* for the carriage of its eggs to the host, the following recently discovered facts relating to the reproductive habit of *Cuterebra* will be of interest, since *Dermatobia* belongs to the same restricted group of flies.

On June 25, 1915, Mr. Raymond C. Shannon, of the Bureau of Entomology, found a female *Cuterebra cuniculi* on the stem of a plant in a low moist spot near a stream in the vicinity of Beltsville, Maryland. The fly was inactive, and had probably recently emerged from the puparium. It was kept alive until July 2, 1915, when it was seen to be growing weak, whereupon it was killed and dissected.

The uterus was found to be of the double-sac incubating type, much after the style of *Sarcophaga,* probably independently developed in the Cuterebidæ and not indicating any close relationship with the Sarcophagidæ. The uterus was estimated to contain well over five thousand eggs and perhaps nearer ten thousand. It is difficult to make a close estimate, as the eggs are disposed in bunches at various angles to each other and the two large sacs which constitute the uterus are irregularly rounded.

The egg is elongate, about 1.75 mm. in length, about .4 mm. in greatest width, gently tapering toward the caudal end, suddenly tapering at the cephalic end, with tough extra-thick and strong reticulated chorion of a deep salmon color, and is furnished with an operculum or lid on one side at the cephalic end. The lid hinges by its cephalic edge, but is easily completely detached. The chorion appeared to be particularly viscid at and near the caudal end. The embryo was undeveloped. The tubular glands are large and evidently functional, and contained a deep rufous-yellow substance. The ovipositor is simple and without any piercing structure.

The presence of the incubating uterus, enveloped with tracheæ, indicates that the egg is held within the fly until the maggot is well formed. The presence of the thick chorion indicates that the maggot is ejected still ensconced within the shell, or that practical oviposition takes place. The simple structure of the ovipositor shows that the egg is not thrust through any integument or surface. Moreover, the fact that the chorion is tough, extra-strong and deeply colored indicates that

[5] Concluded in *Meteorologische Zeitschrift,* April, 1915. Translated in *Monthly Weather Bureau,* April, 1915, pp. 179–181.